Scientific Notation

Objectives:

…to represent numbers using scientific notation
...to convert numbers written in scientific notation to standard notation

Assessment Anchor:

8.A.1.1 – Represent numbers in equivalent forms.

NOTES

Scientific notation:  a way to write numbers using a power of ten
(which our number system is based on)

*** Usually used to express very large or very small numbers!!

Key parts:  

7.54 \times 10^7  \quad 2.8 \times 10^{-4}

- Part #1
- Part #2
- Part #3

- a number that is less than 10, but at least 1
- “\times 10”
- exponent which may be + or –

*** Positive exponents are for LARGE numbers (10 or more)
*** Negative exponents are for SMALL numbers (less than 1)

****That means: The exponent to use for a number that is at least 1, but less than 10.... is..... _____.
Scientific Notation

To write a number in scientific notation:

1. Locate the decimal point
2. Move it to a location that will give you a number between 1 and 10 (or 1 exactly)
3. Write this new number down, followed by “× 10”
4. COUNT how many times you had to move the decimal point …use this number as your exponent
5. Decide the sign of the exponent.
   a. Large number makes exponent positive.
   b. Small number makes exponent negative.
   c. Number less than 10 but at least 1 makes an exponent of zero.

**EXAMPLES**

1) Write 3,500,000 in scientific notation.
   
   3,500,000 -----> 3.5 × 10^6

2) Write 0.000467 in scientific notation.
   
   0.000467 -----> 4.67 × 10^-4

3) Write 0.00000506 in scientific notation.

4) Write 83,040,000,000 in scientific notation.

5) Write 46.2 in scientific notation.

6) Write 3 in scientific notation.
Scientific Notation

To write a number in standard notation:

1. Use the exponent to determine if the number is LARGE OR SMALL
2. Determine which way to move the decimal point
3. Move the decimal point the number of times the exponent says to
4. Write the number you now have

MORE EXAMPLES

7) Write $4.59 \times 10^7$ in standard form.
   
   $4.59 \times 10^7 \rightarrow 45,900,000$

8) Write $2.14 \times 10^{-3}$ in standard form.
   
   $2.14 \times 10^{-3} \rightarrow 0.00214$

9) Write $5.01 \times 10^{-5}$ in standard form.

10) Write $8 \times 10^8$ in standard form.

11) Write $2.97 \times 10^{-2}$ in standard form.

12) Write $4.25 \times 10^{11}$ in standard form.
## Scientific Notation

### MORE PRACTICE PROBLEMS

<table>
<thead>
<tr>
<th>Scientific Notation</th>
<th>Standard Notation</th>
</tr>
</thead>
<tbody>
<tr>
<td>$7.28 \times 10^{10}$</td>
<td></td>
</tr>
<tr>
<td>$3.409 \times 10^{-3}$</td>
<td>0.00000581</td>
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<tr>
<td>$9.1 \times 10^{4}$</td>
<td>9,081,000,000</td>
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<tr>
<td>$1.54 \times 10^{-5}$</td>
<td>5.31</td>
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<tr>
<td>$6 \times 10^{5}$</td>
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<td>$8.4 \times 10^{-6}$</td>
<td>0.000000004</td>
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<td>$6.02 \times 10^{8}$</td>
<td>56,090,000</td>
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<tr>
<td>$4 \times 10^{0}$</td>
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